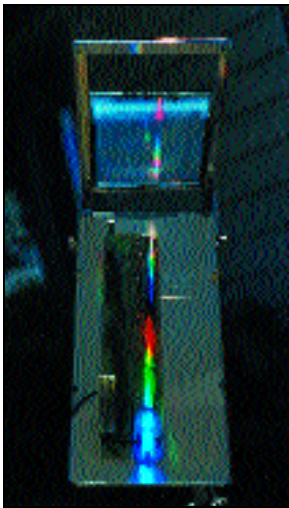


... full-color display holograms that add flair to promotional applications.

GEARING UP FOR MASS
PRODUCTION OF
FULL-COLOR DISPLAY
HOLOGRAMS, HOLOS
OFFERS HOPE FOR A
TOWN'S REVITALIZATION.



■ HOLOS' spectrally sensitive photovoltaic technology, pictured above, greatly improves the efficiency of solar energy conversion.

HOLOGRAPHIC TECHNOLOGY BRIGHTENS A TOWN'S FUTURE

When a producer of medical instruments in Fitzwilliam, New Hampshire, shut its doors in 1994, more than 300 high-tech workers lost their jobs and the entire town felt the repercussions. Then a new manufacturer of holograms, the HOLOS Corporation, set up shop, offering new hope for the town's revitalization. Commercializing BMDO-funded work conducted at Northeast Photosciences (Hollis, NH), HOLOS built on holographic photovoltaics work originally developed to produce solar electricity in space. This work led to HOLOS' production of full-color display holograms.

Often associated with images on credit cards and packaging, holograms represent a growing market. *Holography News*, an international business newsletter of the industry, estimates this market at \$200 million in 1995 for embossing alone.¹ However, holography applications extend beyond advertising, packaging, and artistic use into the areas of energy production and conservation. HOLOS currently sells customized full-color displays for promotional applications and expects mass production of full-color displays to begin in mid-1997. The company expects to create at least 60 high-technology jobs in Fitzwilliam within one year of beginning mass production; that number should double as production shifts into high gear.

In some of its more novel applications for its facilities, HOLOS plans to produce holographic films for daylighting. These films will bend sunlight into darkened rooms, allowing building engineers to track and control the amount of sunlight that enters offices. Many expect holographic-coated windows to reduce the need for lighting and air conditioning enough to pay their cost to the consumer in less than a year. A holographic awning, another product in the planning stage, will use treated glass to refract sunlight, brightening the area under it.

HOLOS also plans to produce holographic photovoltaics for terrestrial uses. The holographic device originally developed at Northeast Photosciences greatly improves the efficiency of solar energy conversion, with net conversion efficiencies of up to 30 percent. Arizona Public Service has agreed to host a massive hologram test site for utility-scale power generation. A cost analysis of this technology shows that if one includes environmental cleanup costs with the initial cost of nuclear and fossil fuels, holographic photovoltaic costs are comparable. Holograms could allow solar cells to produce electricity for just five to six cents per kilowatt-hour.

HOLOS has had discussions with a venture capital investor interested in improving the performance of solar cells. The Naval Air Warfare Center at China Lake, California, is interested in using the hologram in SELENE, a program to beam power to a satellite solar power system using a free-electron laser.

ABOUT THE TECHNOLOGY

HOLOS' single-element hologram spectrally separates light and focuses it perpendicular to the hologram in a thin concentrated line. Spectrally separating the light, the hologram lets two or more different solar cells absorb only those wavelengths each cell most efficiently converts to electrical power. Only light of high visibility (active radiation) is diffracted to the solar cell, while the undesired infrared radiation totally bypasses the cells, thereby reducing cooling requirements. In addition, the technology's side-by-side design (or side focus) replaces the difficult-to-cool stacked design and improves solar cell efficiency, eliminating shadow effects.

¹1995: The year holo packaging took off. 1995. *Holography News*. December/January. World Wide Web at <http://www.hmt.com/holography/hnews/decjan.htm>.